FACT SHEET

DISCOVERY JETCHECK

In-Line, High Speed, InkJet Nozzle Inspection Solution

PRODUCT OVERVIEW

The growing shift towards environment-friendly digital inks and advancement in printing technology are a few of the key trends witnessed today in the global printing market.

Innovation and development continue across the supply chain as the market for inkjet technology matures, creating opportunities for print companies and packaging converters, together with their equipment and consumable providers. The low cost of inkjet printing technology, digital inks and higher print quality are fuelling the demand for Inkjet for commercial printing applications.

Although the printing and packaging industries mostly use the conventional analogue methods, digital inkjet technology is starting to revolutionize the printing industry with the global inkjet print market expected to grow by a CAGR of almost 10% (2018-2023), reaching nearly $110 billion[†].

Advantages of InkJet

Inkjet technology offer several advantages over other printing methods such as non-contact printing, faster speeds, higher quality and accurate printing whilst being highly cost effective.

These inherent advantages have attracted the attention of many leading print equipment suppliers, who have invested a great deal of money in developing new inkjet printing systems, much more than in any other printing technology. The prize is not just a press sale; many vendors will also provide ink and service over the life of a press with attractive margins available on inks.

Blocked Inkjet nozzles

Inkjet printing is a non-impact process, where the ink is emitted through nozzles which are precisely controlled for printing complex shapes or designs.

However, these inkjet print head nozzles are prone to clogging due to dried ink or debris physically impeding the nozzle plate orifice, air bubbles which interfere with ink flow, or due to an electrical failure, an electrostatic discharge or a manufacturing defect. Even when print heads and nozzles have passed initial quality tests, these defects can occur during shipping, installation, or anytime during printing.

The result is a very visible print quality defect in the form of white lines, colour variations, voids, and registration issues. These printing outages are not only degrading the print quality but can be critical if they occur during printing barcodes, QRCodes and variable data such as unique identifiers, serial numbers, dates, etc.

With digital presses now operating at very high speeds, the operators stand little chance of detecting these print defects manually which can quickly produce large amounts of waste, which require reprinting - increasing production costs and lowering profit margins. Moreover, if the defective print goes out undetected and uncorrected, it could result in expensive rejects, financial penalties or worse, loss of business for the printer!

A high performance, inline inkjet print quality inspection solution, which automatically detects defective nozzles and feeds this data back to the Inkjet controller, is required to prevent production costs spiralling out of control and to mitigate risks due to defected print going out.

DISCOVERY JETCHECK for Automated, Inline Nozzle Inspection

DISCOVERY JETCHECK provides a simple, yet powerful solution for automatically detecting blocked or defective inkjet nozzles. Through capturing a high resolution image of a specified inspection test pattern printed by the inkjet head, DISCOVERY JETCHECK analyses the scanned image to determine the precise location of defective inkjet nozzles. A detailed nozzle report (either 1 for defective or 0 for good for every nozzle) is created, which can be used by the inkjet controller software to update its print mask routines to compensate for blocked nozzles.
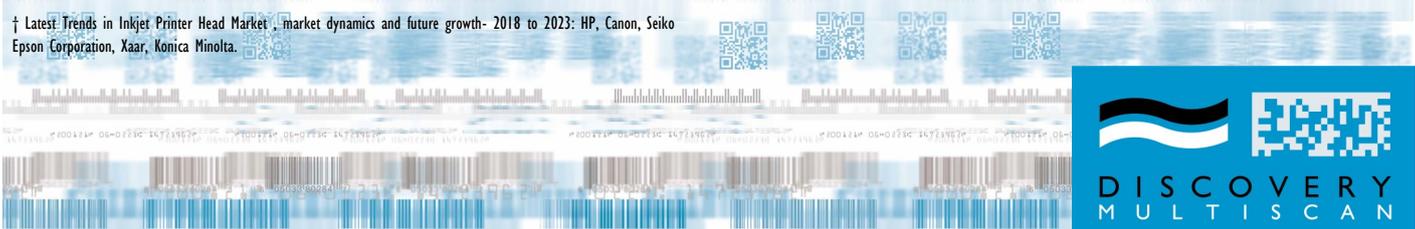
DISCOVERY JETCHECK for Multi Inkjet Head Alignment

Commercial ink-jet printers typically include multiple page width inkjet heads mounted on a fixed frame. Properly controlling the arrangement of these heads, containing different coloured inks, will result in a wide spectrum of perceivable colours and resolutions. However, the clarity and quality of the resultant image is affected by the accuracy of the alignment of each inkjet print head to each other or with respect to the side edge of the medium or both. Minute adjustments are required to ensure the ink droplets from one head interlaces precisely with the next to achieve the desired print quality and registration.

DISCOVERY JETCHECK measures the minute distances between test lines printed by alternate heads to calculate the adjustments required (in PELS or µrads) to correctly align one inkjet head in respect to the other.

Conditional Logic Processing

Functioning as a DISCOVERY Multiscan3 inspection tool, DISCOVERY JETCHECK has access to a wide range of capabilities such as Conditional Logic Processing. This allows for multiple, variable inspection functionality. For example, an identifier on a print repeat header can indicate the presence of a test pattern, and therefore a test pattern inspection. A different identifier on the next print repeat can commence a full inspection application that can include print quality, variable data integrity, barcode grading etc. Therefore a print run can consist of variable pages featuring header information, test patterns, complete variable page job printing, and trailing information. The solution can adapt its inspection needs from image to image, repeat to repeat to provide a comprehensive print quality, variable data integrity, reporting and control system.

† Latest Trends in Inkjet Printer Head Market , market dynamics and future growth- 2018 to 2023: HP, Canon, Seiko Epson Corporation, Xaar, Konica Minolta.

DISCOVERY
MULTISCAN

FACT SHEET

FEATURES

Camera Technologies

DISCOVERY JETCHECK is uniquely positioned to operate with a wide and diverse variety of camera technologies. From simple area scan to high resolution Contact Image Scanners such as the DISCOVERY MaxScan, or high resolution multi-line, Line-Scan cameras.

These devices enable the capture of images with resolutions in excess of 1800DPI for the inspection of high resolution inkjet devices where test patterns are used to identify head and jet alignment and individual missing or blocked jets.

In most cases test patterns are designed to highlight defective print heads at lower camera resolutions, for example a camera capturing at 600DPI is sufficient to identify a missing or blocked jet printing at 1200DPI.

DISCOVERY MaxScan device is ideal for this, operating at a fixed 600DPI in full colour at speeds up to 130m/min.

Equally, a 16K linescan camera can be used over a 10" (250mm) web width to provide 1600DPI image resolution to identify specific print defects.

Inspection Patterns

Below are three common inkjet test patterns which can be used. Furthermore, custom inspection patterns and tools can be designed, or can be modified to meet the demands of a specific or an unique test pattern.

Dash Mark

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Each print head, 13 in this example, prints a solid bar. The tool uses a blob search to find the bars, and detect breaks in them or stuck jets which causes streaks in the vertical direction.

GRID Pattern

In this pattern, every nth inkjet is printed (n=12 in example below) in n rows to form a grid pattern. Each line in the grid is scanned to check for missing verticals (which correspond to jets).
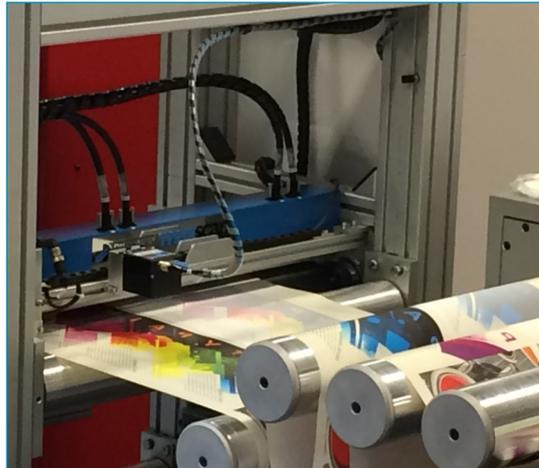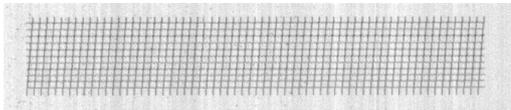
Comb Pattern

Similar to the Grid pattern, the lines are printed next to each other. This mark is used when the printer is very high resolution and a single defective inkjet nozzle needs to be detected. In a Comb pattern, blocked inkjet nozzles appear clearly as a white gap when the comb is scanned horizontally.
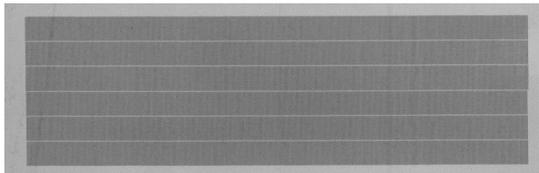
ADVANTAGES

- **Machine independent -** Can be retro-fitted to most existing inkjet presses and printers
- **Scalable -** adapt to changing customer requirements. minimizes obsolescence
- **Reliable -** Using a wide range of camera technologies, with varying resolutions to inspect detective nozzles and head alignment at high speeds
- **Flexible -** Ability to inspect multiple test patterns and evoke other inspection tools simultaneously, page by page or using Conditional Logic Processing
- **Supported -** Comprehensive maintenance contracts featuring remote diagnostics

BENEFITS

- **Improve Head Quality & Lower Costs** - Detect defective heads prior to shipping prevent costly rejects and returns
- **Improved Productivity** - Automate and simplify inkjet heads inspection processes
- **Compliance** - Ensure all InkJet heads comply to client needs and government regulations
- **Increased Customer Satisfaction** - 100% Inkjet head inspection meets requirements of large, demanding customers
- **Increased Revenues**: Attract more clients with assurances that your product performs in the field as promised.